The Corelation between the Duration of Using Waterproof Foundation and the Incidence of Acne Vulgaris in Female University Students

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Abstract

Acne vulgaris (AV) is a chronic inflammatory disease of the polysebaceous follicles of the skin. Lesions that can be caused by AV can be in the form of papules, pustules, modules, or comedones. Based on a preliminary study, many UNISSULA Medical Faculty students have AV and many use foundation. The purpose of this study was to determine the relationship between the duration of using foundation and the incidence of AV in Unissula Medical Faculty students. This research is an observational study with a cross sectional design. The sample is a student of FK UNISSULA Class of 2019 and 2020 who uses a waterproof foundation. The exclusion criteria for the sample were students who had not passed the module, had many activities so that they slept < 6 hours, one week before the exam, one week before and during menstruation. There were 47 respondents of UNISSUA FK female students, 17 (36.2%) female students suffered from AV and 30 (63.8%) female students did not suffer from AV. The average duration of using waterproof foundation is 4.5 hours. The results of the analysis of the relationship between the duration of using the foundation and the incidence of AV using the Spearman test obtained p0.001, with r -0.482. The conclusion in this study was that there was a relationship between the duration of using the foundation and the incidence of AV with a moderate correlation.

Keywords: Acne vulgaris; the duration of using foundation; waterproof foundation

INTRODUCTION

Acne vulgaris (AV) or commonly known as acne is a problem on the skin, especially facial skin that is experienced by many teenagers in Indonesia. AV is defined as a chronic inflammatory disease of polysebaceous follicles in the skin that occurs mostly in adolescents where the lesions that are often encountered are lesions such as comedones, papules, pustules, nodules (Sibero et al., 2019). AV events are caused by chronic inflammation of the polysebaceous follicles. Inflammation of polysebaceous follicles, one of which can be caused by blockage of polysebaceous follicles due to particles from waterproof foundations that stay for a long time (Kabau, 2012). AV can increase anxiety and depression so that AV sufferers will tend to have feelings of isolation from the social environment, personality changes, and changes in self-confidence (Goman, 2016).

70-90% of AV events occur in adolescence, especially 14-17 years in women and persist until the age of 30 years. The emergence of AV can be caused by the use of cosmetics, personal hygiene, hormones, or the psychological state of an individual person. The use of cosmetics

such as foundation (foundation) in female students continues to increase with time, but the duration of use and the thickness of the foundation are one of the risk factors for developing AV. Foundations that are waterproof (not easily erased even if exposed to water) will clog the sebum glands longer and cause an increase in the production of the sebum glands. Some waterproof foundations also contain ingredients that are acnegenic or comedogenic so that they will increase the risk of developing AV (Kabau, 2012).

The prevalence of AV in Southeast Asia is 40-80% of cases. The incidence of AV in Indonesia reaches 85-100% in adolescents including university students (Kristiani et al., 2017). At Abdul Moeloek Hospital in 2018 there were 66 AV patients, it was found that women (69.7%) experienced more AV than men (30.3%) (Wasono et al., 2020). From a descriptive study with a cross-sectional design at SMA Shafiyyatul Amaliyyah Medan conducted by Purwaningdyah et al. (2013) found that out of 42 respondents who experienced AV, 18 respondents (42.9%) were caused by the use of foundation (base powder). A cross-sectional study conducted by Mardiana (2017) at SMA Negeri 4 Surakarta obtained the result that there was a relationship between exposure to foundation and the onset of AV, using Spearman's analysis a value of $p < 0.000$ ($p < 0.05$) was obtained. A cross-sectional study conducted by Kabau (2012) on female students at the Faculty of Economics, Diponegoro University, Semarang, showed that the most widely used types of cosmetics were powder (86.0%) and moisturizer (58.0%). The most age that suffers from AV is 19 years (28.0%), family history does not affect AV (46.0%), the behavior of cleaning the face regularly (80.0%), stress factors affect AV (70.0%), the types of food that affect AV the most are nuts (84.0%) and fried foods (76.0%). In addition, menstruation affects the incidence of AV (62.0%). There is no relationship between the use of types of cosmetics and the incidence of acne ($p=0.204$). AV also arises due to increased androgen hormones. These hormones will increase when a person experiences stress. AV lesions will be more active 1 week before a woman experiences menstruation due to the hormone progesterone. However, the hormone estrogen can suppress AV growth because the excretion of the hormone estrogen is stimulated by an increase in gonadotropin hormones (Menaidi et al., 2017). Using cosmetics, especially foundation for a long time, will cause an increase in sebum production. The production of sebum will clog facial pores along with dirt and bacteria which will cause AV. Excessive sebum production can be caused by cosmetic ingredients that are comedogenic or acnegenic in cosmetics such as lanolin, petrolatum, essential oils, and pure chemicals (oleic acid, butyl strearic, lauryl alcohol, D&C dyes) (Mardiana, 2017).

METHODS

This study used an observational analytic study with a cross-sectional design. This research was conducted in November 2021 – August 2022 at the UNISSULA Faculty of Medicine. Samples were taken using a questionnaire distributed to UNISSULA Faculty of Medicine students the batch of 2019 and 2020 via the Google form, then samples were selected according to the inclusion and exclusion criteria. Samples that match the inclusion and exclusion criteria were obtained as many as 47 female students. The inclusion criteria are in the form of Student Classes of 2019 and 2020 at the UNISSULA Faculty of Medicine who use a waterproof foundation. The exclusion criteria were in the form of 2019 and 2020 UNISSULA Faculty of Medicine students who had not passed the module, had a lot of outside activities so that their sleep time was < 6 hours, one week before menstruation, during menstruation. Samples that meet the inclusion and exclusion criteria will then be diagnosed whether they have AV or not by a dermatologist at RSISA. The results of the data obtained were then analyzed using the Spearman test to determine the correlation.

RESULTS AND DISCUSSION

Retrieval of research data on Medical UNISSULA students was carried out on June 2, 2022. The research data is primary data which was obtained through a questionnaire which was distributed via the Google form. This research was conducted on 47 students of Medical UNISSULA Class of 2019 and 2020 who used a waterproof foundation.

Table 1. Characteristics of Medical Faculty of Unissula Students

Sample Characteristics	Incidents of AV		
	Arise	Not Arise	%
1. Family history of AV			
Yes	11	12	48,9
No	5	19	51,1
2. Age			
20	7	3	21,3
21	6	22	59,6
22	4	4	17,0
24	0	1	2,1
3. Batch			
2019	11	31	89,4
2020	5	0	10,6
4. Residence			
Rural	7	21	59,6
Urban	9	10	40,4
5. Skin type			
Oily	10	14	51,1
Non-Oily	6	17	48,9
6. Frequency of cleaning the face per day			
Once	0	3	6,4
Twice	13	24	78,7
> 2	4	3	14,9

Based on Table 1, it is known that the characteristics of FK UNISSULA students who have met the exclusion criteria are that FK UNISSULA Students Class of 2019 and 2020 who have not passed the module have a lot of activities outside so that their sleep time is < 6 hours, one week before menstruation, during menstruation. In this study, as many as (51.1%) respondents had no family history of AV and (48.9%) respondents had a family history of AV. Respondents with 21 years of age (59.6%), 20 years of age (21.3%), 22 years of age (17%), and 24 years of age (2.1%). According to the year of class, most of the respondents came from the class of 2019, namely (89.4%) and as many as (10.6%) of the respondents came from the class of 2020. Based on the location of residence (59.6%) the respondents lived in rural areas and (40.4%) of respondents live in urban areas. Respondents who have oily skin type (51.1%) and those who have non-oily skin type (48.9%). Respondents who have a habit of cleaning their face once a day (6.4%), 2 times a day (78.7%), and > 2 times a day (14.9%).

Table 2. The corelation between the duration of foundation use and the incidence of AV

The duration of foundation use (hour)	the incidence of AV				*P*	*c*	$\bar{X}$	S
	Arise		Not Arise					
	N	%	N	%				
< 4,1	2	10,5	17	89,4	0,001	-0,482	4,5	1,170
4,1 – 5	8	44,4	10	55,5				
>5,1	7	70,0	3	30,0				
Total	17	36,2	30	63,8				

Table 2 shows the average duration of using foundation, which is 4.5 hours per day. Respondents who used waterproof foundation for < 4.1 hours were 89.4% more likely to not experience AV, while 100% tended to have more respondents who used foundation > 6 to experience AV. Spearman's Rank correlation test obtained a p value of 0.001 with an r value of -0.482, which means that the duration of use of foundation containing dimethicon is related to the incidence of acne vulgaris. The results of the analysis showed sufficient correlation with a negative sign indicating that the longer the use of foundation containing dimethicone, the less likely to experience AV.

Discussion

Based on the results of the respondent characteristics table (Table 1), it was found that 51.1% of respondents did not have a history of AV in their families. These data are inconsistent with previous research conducted by Kabau (2012) which stated that respondents who had a history of AV in their family were more than respondents who did not have a history of AV in their family, respondents who did not have a history of AV were (38.0%) and (62.0%) of respondents have a family history of AV.

The most age of FK UNISSULA students who use waterproof foundation containing dimethicone and most affected by AV are 20 years old with a percentage of 14.9%. This is in accordance with research conducted by Andriana et al. (2014) concerning the relationship between the use of facial cosmetics and the onset of AV, it was found that the prevalence of respondents was 59.1% experiencing AV with the age range of the respondents being 16-20 years and 84.8%. respondents use cosmetics and the rate of AV incidents is more common in respondents who use cosmetics.

As many as 59.6% of the respondents in this study lived in rural areas, these results were not in accordance with the theory presented by Kabau (2012) which stated that environmental factors that were hot, humid, dusty, lots of pollution would affect the emergence of Occupational Acne. However, it is undeniable that there have been many changes in the environment, in rural areas, where initially there were many trees, many have been cut down, and in rural areas, there have been many means of transportation, which reduced fresh air. This will affect the emergence of Occupational Acne.

The most common facial skin type in the respondents of this study was oily facial skin type as much as 51.1%. These results are in accordance with the theory contained in the article Afriyanti (2015) which states that oily and dirty skin types will cause blockage of the sebaceous gland ducts so that it will increase the risk of developing AV.

The frequency of cleaning their faces in the study was obtained by (78.7%) of respondents cleaning their faces 2 times a day. These results are in accordance with previous research conducted by Kabau (2012) which stated that as many as (80%) of the respondents in his study cleaned their faces regularly at least 2 times a day. Female students who clean their

faces regularly and consistently will minimize the accumulation of sebum in the polysebaceous glands which can later clog pores, causing AV.

Based on the cohort of female students who used a waterproof foundation containing dimethicone and were exposed to the most AV (23.40%) from the 2019 cohort. This could happen because the 2019 Faculty of Medicine students have a busier class schedule than the 2020 class. This is in accordance with research which has been done by Angie (2020) which states that the relationship between the stress scale and the severity of AV has a positive correlation with moderate strength and this is statistically significant (r=0.456; p=0.001).

Based on the results of this study, it was found that the average duration of using a waterproof foundation containing dimethicone in Medical Faculty UNISSULA students was 4.5 hours. So that in this study a moderate correlation was found between the duration of foundation use and the incidence of AV, the correlation in this study was 0.441. These results are in accordance with the literature written by Mardiana (2017) which states that the use of certain cosmetic ingredients for a long time will cause AV. The main cause is the excess oil added to the cosmetic ingredients to make it look smoother. This oil content can clog pores and cause AV.

The results of this study found that 17 (36.2%) female students experienced AV and 30 (63.8%) female students did not experience AV. These results are not in accordance with the research conducted by Mardiana (2017) with the acquisition of 21 respondents at SMK Negeri 4 Surakarta who experienced AV after using Foundation or 42.0%, these results were more than respondents who did not experience AV after using foundation. Previous research was conducted on vocational school students who were teenagers and were in a growth phase so that sebum production on the skin, especially facial skin, tended to be high.

This study found a relationship between the duration of foundation use and the incidence of AV with the Spearman test obtained p = 0.001. The correlation coefficient in this study is -0.482, which means that there is a moderate correlation between the use of foundation and the incidence of AV and the direction of the research is not in the same direction, meaning that the use of foundation for a long time does not affect the occurrence of AV. This direction of research that is not in the same direction can be caused by the substances contained in the foundation that can prevent AV, but these ingredients were not studied further in this study. The results of this study are not in accordance with research conducted by Kabau (2012) which stated that there was no relationship between the use of this type of cosmetics and the incidence of AV. This study also explained the types of cosmetics that were often used by female students, namely powder 86.0%, moisturizer 58.0%, foundation 12.0%, sunscreen 10.0% and cream night/morning 48.0%. The results of this study are in accordance with research conducted by Mardiana (2017) who stated that there was a significant relationship between exposure to foundation and the occurrence of AV.

In this study, researchers were unable to control for confounding factors such as stress levels and female student genetics due to limitations in measurement methods and the small number of samples. Researchers also did not conduct direct and in-depth interviews with respondents. It is recommended that further research be able to control confounding factors such as stress levels and female student genetic factors as well as research conducted by direct and in-depth interviews.

CONCLUSION

There is a relationship between the duration of foundation use and the incidence of AV with moderate correlation. The limitations of this study, it is hoped that further research can be

carried out in-person and in-depth interviews. Other studies can be carried out by controlling for confounding factors such as stress levels and genetic factors.

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